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ON THE FISHES OF THE TERTIARY SHALES OF THE SOUTH PARK.

By E. D. Cope.

The survey of the present season has added to the few species already scribed, from the beds above named,* two forms of the genus *Amia*, ich are described below. The species previously known belong to genera *Amyzon*, Cope, and *Rhineastes*, Cope, members of the sucker catfish families, respectively. Both genera are nearly allied to exist- forms, and the addition of *Amia* increases the modern facies of the thyic fauna of the period in question. The discovery strengthens the dence for the view that the waters inhabited by these fishes were mpletely isolated from access of salt or brackish water, thus differing m the beds of the Green River epoch, and occupying a later position the scale of periods.

list of the species now known from this formation is appended.

MYZON COMMUNE, Cope, Bulletin United States Geological Survey ts., No. 2, p. 50.

HINEASTES PECTINATUS, Cope, *loc. cit.*, p. 49.

MIA SCUTATA, Cope, *sp. nov.*?—Represented by a specimen which the head and body anterior to the middle of the long dorsal fin. anal and part of the dorsal fin and the heterocercal tail are well layed. The species differs from the existing *A. calva*, L., and its co- orary *A. reticulata*, in the large size of its scales, of which only seven half longitudinal rows are visible above the vertebral column. adii of the anal fin number nine, and the caudal vertebræ forty-six, perhaps, one or two missing from the specimen. The ray-bearing al hæmapophyses number twelve.

Measurements.

	M.
from first caudal vertebra to end of caudal hæmapophyses	0.210
of body at anal fin	.100
of base of anal fin	.028
of body of a vertebra	.005
of body of a vertebra	.009

e specimen is of the full size of the *A. calva*.

MIA DICTYOCEPHALA, Cope, *sp. nov.*—Established on a number of mens, but primarily on one in which the caudal and inferior fins anting, and only the posterior part of the skull remains. A sec- onsists of the entire cranium; a third, of the tail; and a fourth, of cimen in good condition, lacking head and tail. The first-mentioned men shows that there are ten or twelve rows of scales above the

* Bulletins of the United States Geological Survey: Bulletin No. 2, p. 49.

vertebræ, and that the dorsal fin commences about an inch behind the
line of the posterior border of the cranium. It also exhibits the strong
sculpture of the surfaces of the latter to consist of narrow inosculating
ridges, inclosing larger and smaller pit-areas.

The specimen exhibits this sculpture to be very marked on the oper
cular, suborbital, parietal, frontal, and sublingual bones, the only one
where it displays the surface. The branchiostegal radii number twelve
the upper large and wide. The subopercular is turned up anteriorly a
in *A. calva*, and is thickened on the border of the suture with the inter
operculum. The sublingual bone has much the form of that of *A. calva*
but is rather wider and there more abruptly contracted than in a speci
men of the latter before me. The orbit is smaller relatively than in *A.*
calva.

It is uncertain whether this and the preceding species possessed the
dentition of *Amia* or *Pappichthys*, Cope, as the mandibular bone is par
tially broken away on the inner side. Some of the teeth are of small
size and abruptly contracted near the apex, so they may belong to the
inner row of the true *Amia*, which is wanting in *Pappichthys*.

The fourth specimen displays the ventral fins and the characteristic
femoral supports. The fins originate about an inch behind the line o
origin of the dorsal fin in a specimen of 0m.055 depth of body. The
scales exhibit also the dermal margin with truncate posterior outline
seen in the existing species; this character is chiefly seen on the abdomi
nal surfaces. There are thirty-five vertebræ between vertical lines
drawn from the beginning of the dorsal fin and end of the basis of the
anal fin; and thirty-two dorsal radii in the same interval; anal radii
nine; ventrals, six.

Measurements.

	M
Depth of body to vertebræ (No. 1)	0.0
Length of four dorsal vertebræ (No. 1)	.0
Depth of one dorsal vertebra (No. 1)	.1
Length of head to free border of operculum (No. 2)	.0
Depth of operculum	.0
Length of head on vertex	.0
Length from end of muzzle to orbit	.0
Length of orbit	.0

AMYZON PANDATUM, *sp. nov.*—Form very stout; the body deeper
relation to its length than in the known species of *Amyzon*: greate
depth just in front of dorsal-fin, and two-fifths the length to basis
caudal. Length of head one-third the latter. Spines of premaxilla
causing a protuberance above the end of the muzzle, as in many existin
Catostomi. Mouth slightly inferior; end of muzzle obliquely trunca
in profile. Dorsal fin elongate elevated in front; radii mostly shor
caudal openly emarginate; anal not very elongate in either directio
ventrals below first rays of the dorsal. Radii, D., III, 31; A., II,
Scales, $\frac{10\text{-}12}{10\text{-}11}$, with concentric and radiating lines well developed. V
tebræ, 6, 17, 10.

Measurements.

Total length	0
Length to basis of caudal	
Length to basis of anal (axial)	
Length to basis of ventral (axial)	
Depth of caudal peduncle	
Depth of anterior anal rays	
Depth at occipital crest	

the another rather larger specimen, which agrees with that abo
scribed, the lateral line is well preserved.
From the South Park, Colorado.

AMYZON FUSIFORME, *sp. nov.*—Represented by a very small fish, whi
hibits fully ossified bones, but may be immature. It exhibits characte
ite distinctive, although the caudal peduncle, anal fin, and opposi
rts of dorsal are wanting. The head is very perfectly preserved, a
of a regularly short-conic form, with equal lips. The attenuated mu
shows none of the obtuseness characteristic of the other Amyzon
nother peculiarity is seen in the ventral fins, which stand below t
ifth instead of the first articulated ray. They are evidently in the
rmal position, and the ribs are undisturbed. The pectorals exte
ore than half-way to the ventrals. There are seven neural spines
out of the first interneural, and sixteen between the latter and the fir
rehæmal. In this, as in the other species, the postclavicle is rath
ongate and acute, and the parapophysial element of the anterior ve
bral mass extends as far down as the line of the middle of the orb

Measurements.

ngth of head	0.0
ngth to line of ventrals	.0
ngth to line of anal	.0
pth at first dorsal ray	.0
pth at occiput	.0